Case-Oriented Design of the Radiology Educational Resource

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Digital Case Library (DCL) is a relational database of neuroradiology cases. DCL is a resource for three educational modules: the Case-Based Differential Diagnosis, Teaching Files, and Quiz. The Case-Based Differential Diagnosis module can be searched through the controlled vocabulary of radiologic findings to find images that match feature description. Using the Teaching File module, the user can browse preselected images that are grouped according to pathology, anatomy, and modality. The Quiz module is a self-assessment program that provides the user with randomly selected images with hidden captions.

INTRODUCTION

We have implemented a Digital Case Library (DCL), a database with a feature-coded image archive. An index for coding image content is structured as a hierarchical description index using the relational format [1]. At present, the case library consists of 300 cases and 1,500 images that present intracranial masses on X-rays, CTs, MRIs, and angiograms. Each image is indexed by radiological descriptors. The hierarchical index of radiologic findings, implemented as a controlled vocabulary, allows multilevel (based on the user's level of experience) query formulation. DCL may be queried for many purposes: 1) to retrieve an image with a specific finding, a set of findings, or a diagnosis; 2) to identify the finding and/or diagnosis for an image; 3) to retrieve an image similar to a target image; 4) to retrieve images that share findings but have different diagnoses (differential diagnosis). DCL provides reusable data for instructional applications and multilevel, conforming to the user experience, access to data [2]. DCL is implemented in 4th Dimension™ (ACI US Inc., Cupertino, CA), a relational database management system, on the Macintosh platform. DCL is a part of the Radiology Resource and Review (R^3) program [3].

EDUCATIONAL ENVIRONMENT

Case-Based Differential Diagnosis - Using this module the user may search for images using combination of radiologic findings, age of the patient and lesion location. Query specified by the user produces a list of relevant cases that may be compared to the case in question as well as a list of differential diagnoses. A hierarchical index of radiologic findings allows search parameters to be entered with various degrees of specificity (at basic observation or interpretation level). The user may browse through retrieved cases, zoom images, obtain image captions, make a correlation between different procedures, and use the keyword search to obtain general textual description for particular pathology.

Teaching Files - This module allows the user to use the image database as a digital teaching file. This module can be used to browse and preview images in the library. The user can retrieve and sort images according to pathology, lesion location, age group, and modality. The keyword search is allowed to narrow the image set. Selected cases including images with captions are displayed. Image records can be easily added to the set, removed, and/or exported to the hard drive along with captions. Print option is available.

Quiz - The Quiz module is used for self-assessment. Case images are randomly displayed for the user who may then formulate a diagnosis for an unknown case. Three types of information are provided upon the user request: 1) an image caption, 2) a case diagnosis, and 3) a differential diagnosis for a case. The user may request additional textual information needed to make a diagnosis.

REFERENCES

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